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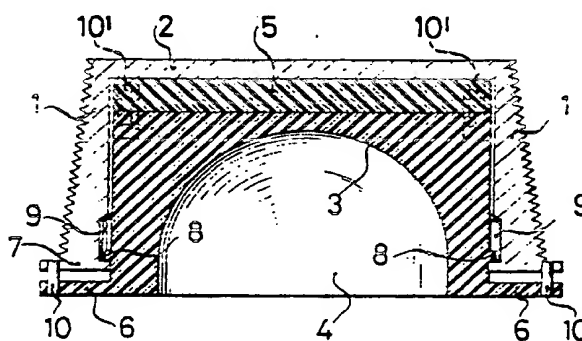
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- (71) Applicants  
Schutt und Grundel  
GmbH, Medizintechnische  
Fabrikation, 41  
Wahmstrasse, D-2400  
Lubeck, Federal Republic  
of Germany
- (72) Inventors  
Hans Grundel,  
Gerhard Schutt,  
Joachim Henssge
- (74) Agents  
Baron & Warren, 16  
Kensington Square,  
London W8

## (54) Hip joint prosthesis

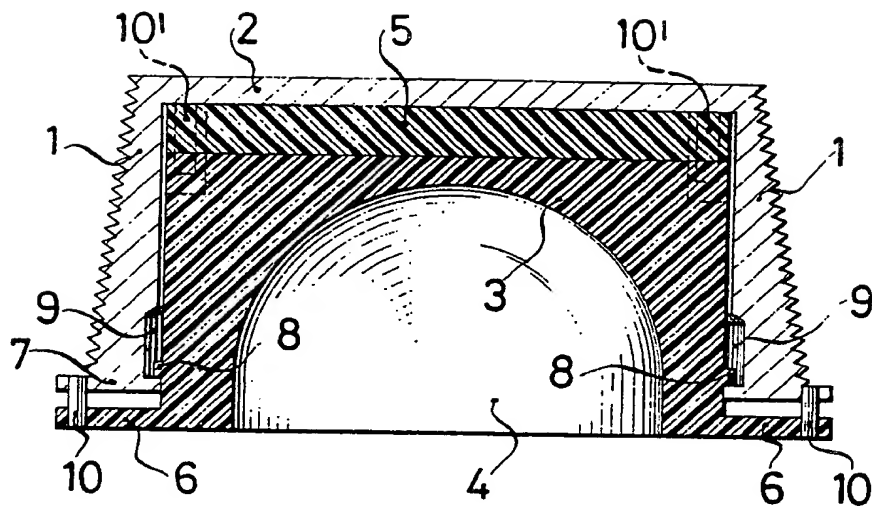
(57) A joint socket for the spherical head of a hip joint endoprosthesis, comprises a rigid, wear-resistant plastics material insert arranged to receive the spherical head of an artificial hip joint within a spherical recess provided therein. This insert is located in a cylindrical cup arranged to be anchored in the pelvis of a patient, and is axially displaceable to a limited

degree against an elastic buffer in the cup, which latter is made of metal or a ceramic material.

Preferably the elastic buffer is in the form of a cylindrical disc and is incorporated in the cylindrical cup between a base thereof and the insert, and the outer peripheral rim of the insert is provided with a radial flange which is axially spaced from the rim of the cylindrical cup



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## SPECIFICATION

Improvements in or relating to joint sockets for the spherical head of a hip joint prosthesis

Upon replacing a hip joint by a joint

- 5 endoprosthesis, the procedure commonly applied consists on the one hand in replacing the natural ball joint socket or acetabulum in the pelvis of the patient by a socket of plastics material, ceramic material or metal and on the other hand in
- 10 replacing the spherical head of the thigh bone or femur by a spherical head of metal, ceramic or analogous material, and in bringing these two parts into engagement. In the case of known hip joint endoprostheses, the spherical head of the joint
- 15 prosthesis is placed in hard and direct contact within the inset joint socket of the prosthesis, so that the vertical strains arising when the patient is walking or running are borne directly and comparatively rigidly by the joint prosthesis, which
- 20 must obviously lead to wear on the replacement joint and also implies jolting of the patient.

It is an object of the invention to eliminate or to reduce as far as possible the attrition which it has hitherto been usual to expect.

- 25 This problem is resolved in accordance with the invention by installing a rigid, wear-resistant plastics material insert which receives the spherical head of an artificial hip joint within a spherical recess, in a cylindrical cup which is to be anchored
- 30 in the pelvis of the patient, in such manner that it is axially displaceable to a limited degree against an elastic buffer, said cup being of metal or ceramic material.

- As a result of this arrangement, jolts
- 35 engendered when the patient treads on the ground are taken up elastically by the artificial hip joint replacing the natural joint, since the spherical head may now thrust the joint socket or the plastics material insert against the buffer in
- 40 elastically yielding manner and compress the latter resiliently at every step taken by the patient, so that the shock of each step that the patient takes is absorbed practically elastically within the joint and the contact surfaces of the artificial hip
- 45 joint undergo but very little attritive stress, so that a substantially increased service life of the artificial joints may be expected. Apart from this, every step is now borne in smooth and elastic manner by the patient, and the walking or running
- 50 motion is thereby also eased decisively.

- In order that the invention may be more clearly understood, reference will now be made to the single figure of the accompanying drawing which shows an axial section of a joint socket of an
- 55 artificial hip joint according thereto by way of example.

- Referring now to the drawing, in the embodiment shown, a joint socket intended for the spherical head of a hip joint femur prosthesis
- 60 comprises a cylindrical cup 1 having a delimiting base 2, consisting of a metal, that is compatible with human body tissue and intended to be anchored within a patient's pelvis. For perfect anchoring, the cup 1 is externally roughened e.g.

- 65 by grooves or screw threads as shown. An insert 3 of a suitable plastics material and having an approximately hemispherical recess 4 is mounted in the cup 1, 2, in such a manner that it is axially displaceable to a limited degree, that is to say so that the substantially rigid insert 3 bears against a
- 70 buffer 5 of elastically yielding material advantageously consisting of silicone. To limit the axial displacement of the insert 3, stops are incorporated, e.g. by providing the insert 3 at the
- 75 rim of the recess 4 with outwardly directed projections or with a radially-projecting flange 6 which is spaced a few millimetres from the terminal edge of a flange 7 of the cylindrical cup 1, corresponding to the compressibility of the elastic
- 80 buffer 5 and to the degree of axial displacement of the insert 3 in the cylindrical cup 1, 2.

- In order that the insert 3 cannot emerge from the cylindrical cup 1, 2 and cannot be lost during transport for example, its external periphery is
- 85 provided with individual circumferentially distributed small projections or with a slightly projecting encircling ring of flange 8, which engages in a groove 9 in the inner wall of the cup 1. The groove 9 also has a minimum width equal
- 90 to the degree of axial displacement of the insert 3 in the cup 1. Finally, for axial guiding of the parts 1 and 3 into each other, axially parallel guiding pins 10 may be incorporated in the flanges 6 and 7, which are secured either in the flange 6 or in the
- 95 flange 7. It is also possible to provide the guides 10 inwardly, as shown by the dotted lines.

- The joint socket described is inset into an excised recess of the pelvic bone and anchored therein in any manner usual in the art, and the
- 100 spherical head of an artificial hip joint femur is engaged in the spheroidal recess 4. The patient may subsequently walk in a springy manner by virtue of the joint socket, because with every step on the ground, the buffer 5 is compressed
- 105 elastically by his body weight and expands again afterwards, so that a more protracted service life of the joint socket or of the entire artificial hip joint becomes possible.

## CLAIMS

- 110 1. A joint socket for the spherical head of a hip joint endoprosthesis, comprising a rigid, wear resistant plastics material insert arranged to receive the spherical head of an artificial hip joint within a spherical recess provided therein, the
- 115 insert being located in a cylindrical cup arranged to be anchored in the pelvis of a patient, and being axially displaceable to a limited degree against an elastic buffer in the cup, the latter being made from metal or a ceramic material.
- 120 2. A joint socket as claimed in claim 1, wherein the elastic buffer is in the form of a cylindrical disc and is incorporated in the cylindrical cup between a base thereof and the insert, and wherein the
- 125 radial flange which is axially spaced from the aperture rim of the cylindrical cup.
3. A joint socket as claimed in claim 1 or 2,

wherein the periphery of the plastics material  
insert is provided with distributed projection  
means which engage in a groove in the inner wall  
of the cylindrical cup, the width of the groove  
5 being at least equal to the compressibility of the

buffer and the degree of axial displacement of the  
insert within the cylindrical cup.

4. A joint socket substantially as hereinbefore  
described with reference to the accompanying  
10 drawings.

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